The Northwestern MILLER

MILLING PRODUCTION SECTION

A Common Denominator for Bolting Cloths

The Problem Analyzed

By Fritz Tobler

EDITOR'S NOTE: An article entitled "Wanted: A Common Denominator for All Bolting Cloths" appeared in this journal in July. The author was Henry Nelson of Fisher Flouring Mills Co., Seattle. Now, in the accompanying article, Fritz Tobler comments on some of Mr. Nelson's suggestions, and he explains the complications in attempting to rely on marked mesh openings alone as a basis for substitution of one type of cloth for another. Mr. Tobler is president of Tobler, Ernst & Traber, Inc., New York, Swiss silk bolting cloth importer and distributor.

Mr. Nelson, it will be recalled, proposed that all bolting cloths should carry a designation which would indicate the mesh opening of the cloth. He also recommended the micron as the unit of measurement to be used to give the size of the mesh openings.

Mr. Nelson's selection of the micron as the unit of measurement for mesh openings is excellent. The Federal Standards for testing sieves have been based on the micron for quite a few years. Industrial users of screen cloths outside the milling industry specify mesh openings in microns with increasing frequency on their orders.

The micron is well known to scientific workers throughout the world and measurements based on it will be readily understood. As Mr. Nelson has pointed out, the selection of the micron leads to whole numbers, not to three or four place decimal figures. There is little danger of inadvertently misstating the opening by the misplacement of the decimal point.

Mr. Nelson's recommendation to use an indication of the mesh opening as part of the designation of each number of screen cloth fills a very pressing need. For example, we supply screen cloths made of silk and nylon to many industries aside from flour milling. We are often faced with a difficult problem when a customer asks us to supply him with a screen cloth equivalent to "100 mesh wire." The customer does not give us the mesh opening of this wire cloth; very often he does not know it. The filling of the order requires additional correspondence; shipment of the material is delayed; the customer loses time and production.

Every reputable manufacturer of screen cloth, be it made of wire, nylon or silk, knows the mesh opening of his cloths. In most cases, the information is readily available to the user of the cloth. It would seem an easy matter to prevail upon all manufacturers to add the dimension of the mesh opening to the designation of the cloth. Substitution of one type of cloth for another could then be made on the basis of the marked mesh opening.

Complications Noted

Unfortunately, there are some complications with which the rest of this article will concern itself.

In the first place, reliance on mesh openings alone as a basis for substitution can be very dangerous and misleading. Some other factors have a decisive effect on the result of the sifting operation. They must be taken into consideration.

With all other factors being equal, the mesh opening would be the one decisive factor in the result of the screening operation. Unfortunately, some factors other than mesh opening are not equal when we replace one type of fabric with others. When a change is made from wire to silk or to nylon, or from silk to nylon, the electrostatic properties of the screen cloth do not remain the same. Wire is a conductor; silk and nylon are not. The electrostatic properties of silk and nylon are not the same. As the static charges build up on the screen cloth, some of the material to be screened will be attracted to the fibers of the screen cloth and will adhere to them. This will reduce the effective size of the mesh opening. The degree to which static charges are built up depends not only on the screen cloth, but also on the type of material that is to be screened.

The gradual introduction of nylon fabrics for screening purposes, in place of silk and wire cloth, has provided some interesting illustrations of the effect of static electricity. We have learned that it will take different numbers of nylon cloth to replace one number of wire (or even one number of silk) in different industries. Each application seems to present its own problems. There is no general formula which would give the solution. The mesh opening is used as the initial starting point, but beyond that each user has to determine by experimentation what particular substitution will give him the best results.

Different Methods

In the second place, the values for mesh openings given by various manufacturers are based on different methods of measurement and their value for comparative purposes is limited. Mr. Nelson has pointed out that the mesh opening of a wire cloth can be calculated quite easily, provided we know the diameter of the wire and the number of wires per linear inch (the mesh count). This is the method commonly used for wire cloths. It is also applied very easily to fabrics made with nylon monofilament yarn. Such yarn is round and solid; it is in fact a plastic wire.

The results arrived at by this calculation are very reliable provided the manufacturer adheres strictly to the fabric specifications originally set by him for each number of cloth. Actual measurements of mesh openings of such fabrics may give slightly different results. The variations from the standard can be explained by the unavoidable slight variations in actual wire and yarn diameter and mesh count.

In theory, the same simple method should apply to the determination of the mesh openings of silk bolting cloth or of screen cloths made of nylon multifilament yarn. In practice, the method cannot be used because there is no figure of sufficient accuracy which could be given to the diameter of the silk or nylon multifilament yarn. Let us see why this is so.

A silk thread consists of a large number of individual silk fibers, twisted together to form it. The firmness, roundness and compactness of this thread will depend on the type of twist given to the yarn. Wires or nylon monofilaments are uniformly solid, but any thread formed by twisting together a multitude of filaments will contain a substantial percentage of air space within its apparent volume.

We know the weight of a silk thread. It is given by the denier, the commercial designation for silk and silk-type synthetic yarns. The denier is the weight in grams of 9,000 meters of the thread. In the case of a monofilament yarn of known denier, the diameter can be calculated easily by assuming that the yarn is solid and round (which it is supposed to be). The density of nylon is the only additional fact we need to know.

Knowing Weight No Help

But knowing the weight of the silk or nylon multifilament thread does not help us. We do not know the amount of air space within the apparent volume of the twisted thread. It will depend on the type of twist, and in the case of the nylon multifilament yarn, on the amount of static electric charges present on the thread at the time it was twisted. In the case of silk, we do not know the density with enough exactness. It varies from lot to lot.

Furthermore, twisted threads composed of a number of filaments will be deformed when pressure is applied to them. The amount of deformation —which shows itself in a flattening of the thread—depends on the amount of pressure applied to it and on the type of twist given to the thread.

During the weaving of the fabric, the warp and woof threads exert pressure upon each other at the point where they cross. They will flatten each other out. The amount of the flattening will depend on the respective twist of the two threads and on the amount of pressure (which will be a function of the tension of the threads). The thread in the finished fabric will be deformed to a smaller or larger degree. It will not be round.

Each manufacturer has his own specifications, as far as twist of the threads is concerned. Furthermore, the tensions applied by different manufacturers in their weaving operations are definitely not the same. They probably vary to a very great extent. As a result, fabrics with exactly the same specifications of mesh count and yarn size (denier) will most likely show different mesh openings for different sources of origin.

To prevent the flattening of the thread by reducing the tension during the weaving operation leads to very unsatisfactory results. The individual threads in a fabric woven with little tension have a tendency to zig-zag through the cloth instead of running as straight as possible. The zig-zagging reduces the size of the mesh openings, makes them less uniform. It also reduces the percentage of open surface and thereby the bolting capacity.

Must Be Measured

It is therefore quite evident that the mesh openings of fabrics made of the conventional multifilament yarns cannot be calculated accurately from the specifications of the fabric. They have to be found by measurements on the finished cloth.

Most manufacturers of bolting cloth

(Continued on page 16a)

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Chlorination of Wheat Wash And Tempering Waters

By Meade C. Harris

EDITOR'S NOTE: Meade C. Harris, Wallace & Tiernan Inc., Chicago, was a speaker at the recently held joint meeting of the Cincinnati Section of the American Association of Operative Millers and the Ohio Valley District of the Association of Operative Millers in Indianapolis, Ind. The accompanying article is taken from his talk.

Although the process of chlorination of wheat wash and tempering waters has been known for some time, it was practiced only sparingly by a few scattered mills until about the time of the close of World War II. During this past decade, mill sanitation has received considerable study and attention by all peoples connected with the milling industry, until now extensive sanitation programs are an integral part of the modern flour and cereal mill operation. It was determined that the features of applying chlorine to wash or tempering waters tied into and complemented the over-all sanitation program very well.

When chlorine is added to wheat tempering and wash water it freshens up the areas of the mill where these operations take place, drastically reducing objectionable odors caused by soured or decayed material by reducing slime, vegetation, fungi and rope spore growth. It reduces—in time—the bacteria count in the finished flour. It reduces the above-mentioned growths in the conveyors, spouting, tempering bins and in the equipment throughout the mill. It is beneficial on the bran stock, especially in warm weather, also on whole wheat. While not a panacea it is helpful in stabilizing the flour used in package goods for ready to cook and serve products.

British Opinion

The British publication, Milling, carries a section of questions from milling students regarding the industry. The Oct. 9, 1954, issue discussed chlorinated water in the mill thusly:

"As regards the use of chlorine and chlorinated water in the mill the following notes are of great interest. It has been shown that freshly and normally milled patent flour contains, per gramme, less than 20,000 blood-heat bacteria, straight-run less than 50,000, and low grade up to 300,000 or more, demonstrating that the bacterial flora of flour is derived very largely from wheat skins. Ropiness in bread is a condition arising in the loaf from the development of the organisms of the Group B mesentericus, which is soil derived and therefore widely dispersed in harvested root crops and cereals. It has been shown that if a flour contains greatly in excess of 40 spores per gramme, there is a danger of rope developing in the baked goods.

"Experimental work has shown that 180 p.p.m. of chlorine will kill rope spores, but if chlorine is applied to wheat 16 hours after tempering, a chlorine dose of 10 p.p.m. will effect a reduction of approximately 90% in the total rope count, due probably to the spores being in a transitory or vegetative form at this stage of the tempering.

"In a particular experiment, wheat known to be contaminated with rope spores was milled with and without prior chlorination. The unchlorinated wheat yielded a flour containing 70/80 spores per gramme and the chlorinated only 3/5 spores per gramme.

"The heating of bran during storage is known to be very largely due to bacterial activity, and to result in putrefaction and spoilage. It has been shown that wheat skins teeming with bacterial life can be rendered virtually sterile by chlorination, and remarkable improvements in bran keeping qualities have resulted from the application of this process."

Factors in Planning

In regard to preparation and application of chlorinated tempering water to wheat, there are a number of factors all of which must be taken into consideration in planning an installation of this type. Some of the more important of these include: 1. The number of tempering applications (first, second and/or third). 2. Variation of field-run wheat moisture. 3. Types of wheat being tempered. 4. Number of mill units involved. 5. Source of water supply. 6. Temperature range of tempering water. 7. Water pressures available. 8. Maximum and minimum capacity of the mill with allowance for increase of capacity.

Maximum and minimum tempering water requirements are vital as they are an indicator of chlorine usage since the chlorine application is controlled by a given p.p.m. residual in tempering water. A normal residual is 100 to 125 p.p.m. in the tempering water. Experience has indicated that 150 p.p.m. is a satisfactory starting point. This level generally can be reduced to 75 to 100 p.p.m. after two or three months operation, when the original "demand" has been taken care of and the system shows stable, positive improvement.

Installation Described

Briefly tracing the operation of a typical chlorinated tempering water installation, water is supplied from an overhead storage tank (or directly from a piped water supply) to the suction side of the booster pump. The booster pump discharges water under pressure through the injector of the chlorinator where chlorine gas is drawn into the water in predetermined amounts. The chlorinated water then flows to the holding tank. From the holding tank the chlorinated water flows by gravity through the Rotameter flow controls and on to the first temper conveyor. Calibrated plugs are generally used on second and third temper. The rate of

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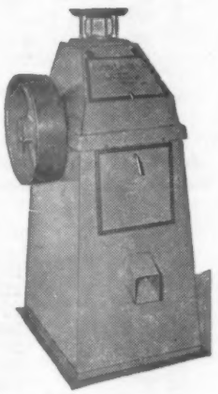

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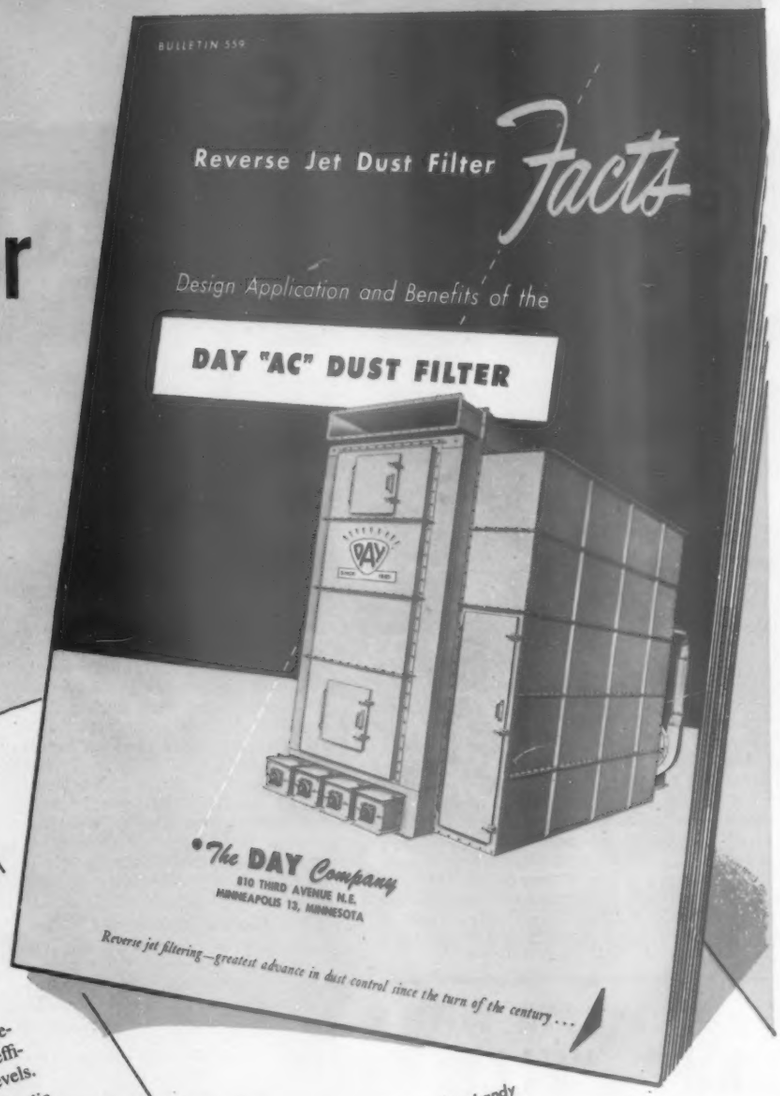
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discharge from the booster pump is always greater than the maximum rate of tempering water used, i.e., the booster pump cycles "off" and "on." The cycling is controlled by high-low level, rod type switches in the holding tank. When the water level in the holding tank reaches the low level switch, the switch closes the electrical circuit and starts the booster pump. The booster pump operates until the water level in the holding tank reaches the upper switch level which in turn opens the electrical circuit and shuts off the booster pump thus automatically maintaining a supply of tempering water of a given p.p.m. between the high and low level switches. If a relatively large amount of tempering water is being used the pump will cycle more often than when a smaller amount is being used.

The use of hydramotor valves is a safety feature against flooding of tempering conveyors in the event the wheat supply is stopped or choked. Mercury, flapper-type switches installed in the conveyors, allow water to flow as long as wheat is coming to the conveyor — when the wheat supply stops the mercury switch activates the hydramotor valve and closes off the water supply ahead of the Rotameters.

Polyethylene has proven to be a very satisfactory and durable lining for the holding tank and is recommended to withstand the high chlorine concentrations involved. Hastaloy steel is the recommended material for the Rotameter bobbins. Tempering plugs are made of hard rubber. Rubber hose is used for conveyance of all solutions containing chlorine.

The major portion of the experience gained in the use of this operation has been in connection with the tempering of hard wheats which will run as high as 6% tempering water added with the average in the 4 to 5% range. Since some millers are concerned primarily with soft wheats where the tempering water added is in the neighborhood of 2½ or less, they are probably wondering if this system has merit in their operations. In other words, would you be able to approach the ratio of chlorine to wheat used on hard wheats when the common carrier — water — is less on soft wheats? It would be possible to do this by increasing the concentration of chlorine in the tempering water. The limiting factor in this consideration is the maximum temperature of the tempering water which is inversely related to the amount of chlorine which can be held in solution without giving off objectionable chlorinous odors—the higher the temperature of the water the less chlorine it can hold properly.

Based on operating experience in several locations, it has been found that 80° F. tempering water will retain 200 p.p.m. chlorine satisfactorily. Projecting from this control line on the basis of "Solubility of Chlorine in Water" charts, we find the following relationships of water temperature and retained chlorine:

Relationships of Water Temperature and Retained Chlorine

Temperature of Water	Chlorine (p.p.m.)
80° F.	200
75° F.	218
70° F.	230
65° F.	248
60° F.	267
55° F.	292
50° F.	324

Assuming 2% tempering water addition on soft wheat as compared to 4% on hard wheat at 125 p.p.m. comparable chlorine to wheat ratios could be maintained with assurance provided the water temperature did not exceed 65° F.

One soft wheat mill unit, operating parallel to a hard wheat unit and using tempering water of 200 p.p.m. out of a common holding tank, finds beneficial results comparable to that of the hard wheat unit.

—BREAD IS THE STAFF OF LIFE—

PRICE CHANGES

NEW YORK—Price increases in a number of phosphate products were announced by Victor Chemical Works, Chicago.

A Victor spokesman said that increases resulted from "substantially higher wage, power and raw material costs."

The Milling and Baking Industries in Mexico

By William W. Burgee

EDITOR'S NOTE: William W. Burgee is production supervisor for F. W. Stock & Sons, Inc., Hillsdale, Mich. From 1952 to 1955 he was president of the Mexican subsidiary of the Doughnut Corp. of America, Compania Donas de Mexico S.A. de C.V. He traveled extensively throughout the Republic of Mexico and his duties took him into many of the mills and bakeries. He gave an account of the Mexican milling industry to the members of the Wolverine District, Association of Operative Millers, at the fall meeting of the group held in Hillsdale, Mich., recently. The accompanying article is an extract from his talk.

The Mexican milling industry was started by the Spanish settlers in the early 16th century. The mills today range from antiquated water-driven stone mills in the country districts to up-to-date pneumatic mills in the larger cities. In Mexico City itself there are about 20 mills and they produce about 30% of the nation's flour requirement. Monterrey and Gualdajara are cities ranking second and third in order of flour milling capacity.

In the last two years no less than 25 mills in Mexico have been completely remodeled and are using pneumatic handling of European design and manufacture, mainly supplied by Switzerland, Germany and Italy.

Geographically, about 99% of the mills are situated to the north of a line drawn across the country from Veracruz. This means that the states to the south of this line are dependent for their flour mills in Mexico City and the city of Puebla, which lies about 90 miles south of the capital. In size, Mexican mills are not very large, the largest having a capacity of 3,500 sacks a day, but the greater majority are about a quarter of that size.

In the past 10 years, the Mexican government has been increasingly active insofar as setting the minimum price for wheat and the maximum price for flour. At the present time its aim seems to be complete autarchy in the production of cereal grain products. In the crop year 1954-55 there was a government prohibition on the importation of wheat from the U.S. and Canada because of a very slight carryover from 1953-54. However, this year there may be a deficit, and about 100,000 metric tons may be needed to meet the requirements of the industry. A decentralized government agency handles all of the wheat from the major producing areas of Sonora and Sinaloa and apportions it to the mills in the rest of the country on the basis of their capacities. The wheat produced in the rest of the country is sold on the free market, but due to the fact that the demand is usually greater than the supply, the price of this uncontrolled wheat has been from 15 to 20% higher than the minimum price set by the government.

Price Control

The price of flour is determined by the Price Control Agency of the Economic Secretariat and is rigidly enforced, especially in the Federal District, Mexico City, since the biggest volume of business is carried on there. However, the millers do have a very slight say in the fixing of the flour prices, but as most government bodies are slow in acting, and this is especially true in Mexico, and costs fluctuate constantly, the milling industry is usually caught in the middle.

Almost all of the wheat grown in Mexico is winter wheat which is grown on irrigated lands since there is no rain or snow in that season. The growing season is from November to May, and by June the whole crop is harvested. In the large producing areas, the wheat is cut and threshed by machinery but in the other areas most of the cutting and threshing is still done by man power. Spring wheat is comparatively scarce due to heat and heavy rains and for the more important reason, that corn is the traditional crop in what would be the spring wheat season. Corn, not wheat, is the staff of life in Mexico. This is the reason why a total of 22 million bushels of wheat is ample at the present time for the more than 31 million inhabitants of the country.

White bread, as we know it here, is produced in sizable quantity by only three bakeries in the whole republic, and is mainly sold to the American population (there are over 30,000 Americans in Mexico City alone), and by the hotels and restaurants which cater mainly to the tourist trade. Hard rolls are produced in quantities by almost every

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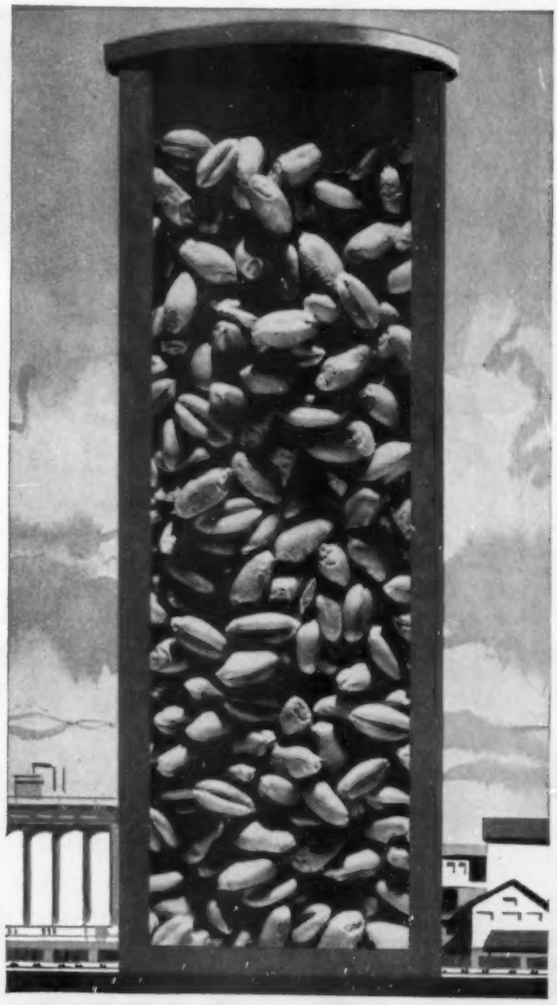

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bakery and are eaten to a great extent by the Mexicans. But, the main bread of the average Mexican is the tortilla, a flat thin pancake type of product made from a dough of ground cornmeal and water which is patted out between the hands and is cooked on stones heated by a wood fire. This is the only type of bakery goods delivered house to house and is sold by the dozen for usually 40¢ Mexican, which is about 3¢ American money.

The types of wheat generally grown in Mexico are shown in Table 1. Of these types, all except Colorado and Barrigon are strains developed in the last 10 years or less by the Agricultural Secretariat in conjunction with the Rockefeller Foundation as quick growing and disease resistant.

Table 1—Types of Wheat Grown in Mexico

Yaqui	Hard red	Med. to high protein
Kentana	Soft red	Low to med. protein
Mexi	Soft red	Low to med. protein
Colorado	Soft red	Low to med. protein
Lerma	Soft white	Low to med. protein
Gabo	Hard white	Low to med. protein
Barrigon	Soft white	Low protein

Lack of Control

As the specifications of any one type of wheat differ greatly from one section of the country to another and most of the time, even in the same locality, the milling process requires a great amount of blending to secure the flours needed. However, this blending is not done on any controlled basis since in most of the mills, even the large modern equipped ones, they do not have laboratories, as we know them, to give them all of the data which will allow the millers to efficiently control the blending of the various wheats to produce a certain type of flour. One of the major problems in Mexico is that of first securing a source of supply for certain types of flour and, secondly, to try to establish specifications for these flours to assure a relatively consistent product.

The major mills do not have any equipment for doing any control on the wheat and flour. Some have equipment which is not being used. Analysis could be obtained by sending the flour to one of several laboratories if requested often enough by the buyer.

One of the largest mills in Mexico City is partially owned and managed by a Spaniard, educated in the U.S. at one of our outstanding universities and I used this mill as the subject of what I thought might be the best approach to instigate some sort of control over milling and flour. My approach was that the milling industry in Mexico, although in a very favorable economic situation today due to the fact that they could mill and sell all of the flour from the wheat available, would, in the future become a competitive business with each mill battling to sell its product and that at this time the mill which was in a position to offer something more than a competitive price, meaning a controlled standard flour would be in a position to get the business. The response to this was a question, "How long do you feel that it will be before such a condition exists?" When I said that it would probably be 20 or 25 years, I was politely told that this problem then was not worth considering at this time, that the next generation of milling people could worry about it.

Actually, the handling and milling of wheat in Mexico is much the same as in the U.S. with but a few and slight differences. There is the almost total absence of bulk storage or handling at the mills. They receive cars of wheat and mill them as they are received. The wheat is stored by the government and is allotted over the year. A mill is not able to put in several hundred thousand bushels of wheat at one time even if they had the storage. Another is that almost every mill uses washing machines in its wheat cleaning department to wash the wheat before it is tempered since most of the wheat is very dry and sandy.

Characteristics of Flour

One load of flour of the same brand from the same mill, can be so different in characteristics from the next that you would not know, from an analysis or baking that you had the same flour. We used a straight 12% protein flour, the patent type to make cake doughnuts (fried cakes) and the 10.5% flour to make cake mixes. For the doughnuts. we most always had to reformulate with each car of flour, for the cakes, we cut the flour with corn starch in order to control it for this usage. The char-

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acteristics of Mexican flours are shown in Table 2.

Now as to prices and costs: wheat prices to the millers are not determined by the same methods as we determine them here based on a test weight per bushel and a discounting of the price based on milling value, but the government controls the wheat to a great extent and sets the price and if a mill receives X number of tons of a certain type then the government price is paid regardless of any difference in the wheat. The prices in U.S. funds of the government controlled wheat (Sonora and Sinaloa), including freight charges to Mexico City, in August of this year, were:

Reds ..... $27.25 Mexican=$2.18 bu. U.S.
Whites ..... $26.50 Mexican=$2.12 bu. U.S.
Barrigon .... $23.63 Mexican=$1.89 bu. U.S.

Prices of free market wheats during the same month were:

Reds ..... $32.13 Mexican=$2.57 bu. U.S.
Whites ..... $30.25 Mexican=$2.42 bu. U.S.
Barrigon .... $27.50 Mexican=$2.20 bu. U.S.

The milling and bakery business is very lucrative in Mexico, and, in my opinion, has a terrific future for those people in owner and management capacities. It will be a long time, however, before the workers derive any of the benefits enjoyed by people employed in the same industries in the U.S.

Table 2—Characteristics of Mexican Flours

	Protein	Ash	Moisture
High patent bread ..	12.5	0.40	14.00
Patent	12.0	0.45	14.00
Standard	10.0	0.55	14.00
Pastas	9.00	0.50	14.00
Macaroni	12.5	0.40	14.00
Cake-biscuit	10.5	0.40	14.00

——BREAD IS THE STAFF OF LIFE——

Prairie District 13 Plans Meeting

WINNIPEG—Highlight of the Association of Operative Millers' Prairie District No. 13 meeting, to be held in Lethbridge, Alta., Nov. 18-19 will be a visit to the newly-remodeled flour mill of the Ellison Milling & Elevator Co., Ltd., Lethbridge.

The millers will be invited to see how the system evolved by Thomas Robinson & Sons, Ltd., the British milling machinery engineers, can be used with existing American rolls. The mill is entirely pneumatic.

Included in the business sessions will be an open forum to allow for a review of the Robinson methods. Forming the panel will be Douglas Patterson, Ellison Milling Co.; James T. Wimbush, chief engineer of Kipp Kelly, Ltd., Robinson agent in Canada, and George Hayward and Henrick Gardberg of the Robinson staff.

The address of welcome to the delegates will be given by Reed C. Ellison of the Ellison company. The first paper to be presented to the operative millers will be on Swiss bolting cloth and the speaker will be Fritz Tobler, Tobler, Ernst & Traber, Inc., New York. If he is unable to attend the paper will be given by Roland Tobler who recently arrived from Switzerland to join the firm's New York staff.

W. R. Shane, Strong Scott, Ltd., Winnipeg, will discuss pneumatic flour conveying and he will be followed by E. R. Mays and R. W. Smith of the Keystone Lubricating Co. who will talk about specialized lubrication.

"Nutrition Pays" is the title of the address to be given by Harold Johannson, Merck & Co., Ltd., and this will be given immediately before the visit to the Ellison mill.

At the morning session Nov. 19 Dr. R. S. Sherwood, Sterwin Chemicals, will address the millers and he will be followed by a speaker from the Goodyear Rubber Co. who will talk about rubber belting. The session will wind up with the forum on the Ellison mill.

——BREAD IS THE STAFF OF LIFE——

New Elevator

ELKHART, KANSAS — The Addington Grain Co. has started a new elevator in Elkhart, with Sampson Construction Co., Salina, doing the work. The new elevator will have a capacity of 500,000 bu., said W. H. Addington. Trackage will be on the Santa Fe.

Dow Chemical Reports 19% Increase in Sales

MIDLAND, MICH. — The Dow Chemical Co. has reported net sales of $128,166,671 for the first quarter of its fiscal year ended Aug. 31. This represented an increase of approximately 19% over the $107,822,510 recorded in the same months of 1954.

First quarter earnings were up from $8,544,028 to $11,723,647 while earnings before taxes rose from $17,509,693 to $21,493,856.

The net for the quarter amounted to 51¢ a share for the 22,778,324 shares of common stock outstanding as against 36¢ in the same quarter of 1954 when there were 22,651,010 shares outstanding.

U.S. and Canadian income taxes rose from $8,965,665 to $9,770,209 while depreciation and amortization were slightly lower at $18,743,000 against $18,989,579 in the previous year.

——BREAD IS THE STAFF OF LIFE——

MONTANA EXPANSION

GLENTANA, MONT. — Construction of a new annex at the Glentana (Mont.) Elevator has been completed. Tony Hoegele owns the elevator.

An Entirely New Concept in Grain Protection

Now, after 5 years of research and field testing, Douglas brings you the first practical answer to the problem of costly grain losses due to insect infestation.

Douglas TETRAKOTE is a long-lasting, economical liquid grain protectant. It is applied when clean grain goes into storage or when stored grain is turned, and keeps grain insect-free during normal storage periods.

WHY IS TETRAKOTE SO DIFFERENT?

Because it stops insect damage before it gets started. With old methods grain was fumigated after insects appeared and after damage had occurred. TETRAKOTE prevents weevil infestation rather than checking it once it gets started.

HOW LONG DOES PROTECTION LAST?

A full year! One application of Douglas TETRAKOTE will provide positive protection for periods up to 12 months when applied according to directions.

WILL TETRAKOTE WEAR OFF?

No! TETRAKOTE is formulated to stay on during normal handling. Grain treated with TETRAKOTE can be turned, moved, shipped or handled in any way without reducing the effectiveness of the protective coating.

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Yes! Douglas TETRAKOTE can be applied quickly, easily at the time grain is placed in storage or when it is being moved or turned. Can be applied with the Douglas TETRAKOTE Applicator. Your Douglas representative will assist you in working out the best method for your operation.

IS TETRAKOTE ECONOMICAL TO USE?

Definitely! In fact, it costs you more not to use Douglas TETRAKOTE. Insects can easily cause losses amounting to 70c or $1.00 per bushel in 8 to 12 months. The average cost of applying TETRAKOTE is less than 2c per bushel. One application of TETRAKOTE more than pays for the cost of the protectant.

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Yes! The insect killer in TETRAKOTE is harmless, when used as directed, to the milling, eating and germination qualities of grain. It is approved for application directly on grain and seeds used for human consumption.

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Progress in Solving Current Problems in Feed Production

By Phillip C. Murray
Pillsbury Mills, Inc.

A few years ago we discussed "What the Feed Manufacturer Expects from the Machinery Manufacturers," and in that discussion and the ensuing panel session some specific points were enumerated which were definitely problems in production and maintenance in the feed industry.

Let's view those problems again and see if some of them have been solved and if there are any new problems developing in connection with the vast strides made in production in all industries, and especially in the feed business.

I will list these problems as such and then add a few notes as they are taken up.

Dust control equipment—More is known at the present time about dust control and how to design it into the original plans of our mills than was practiced previously. Even today most new plants will have grinder collectors with some type of secondary collection from the hammer mills in addition to two or three systems for general control throughout the plant.

More work is being done on spot dust control, and more feed companies are vigorously attacking their shrink problems in inventories. There are more dust control equipment manufacturers that are more versed in working with these problems than there were a few years ago.

Machinery to make crumbles with less fines—We now know that in order to cut the fines we must have a good, hard, cool pellet that will not have tendencies to break up, and that a good deal in making good dustless bite-size feed is in the formulation.

Help in pelleting—We still feel the need for better and more adequate coolers or cooling facilities although there are more good coolers on the market today than a few years ago. Apparently there are some good points to the longer horizontal coolers that allow the material to be cooled to reside longer in the cooler and the movements of air.

Formulation of feeds — We cannot expect the machinery people to help us on this problem since it is one of our own doing. We are being called upon to pellet more difficult materials such as urea, molasses, etc. Interlocked with this problem is the cost saving aspect for the customer with protein or carbohydrate substitutions.

Steam problem — When we found that good dry steam is necessary for good production in pelleting, we put adequate separators and traps in our steam systems.

Better, more accurate scales that will give closer tolerances, and will not lose their adjustments so readily: In the past few years the scale manufacturers have done a very good job

EDITOR'S NOTE: Phillip C. Murray, feed production engineer for Pillsbury Mills, Inc., Clinton, Iowa, appeared at the mid-year meeting of the Grain Processing Machinery Manufacturers Assn. to discuss progress in meeting certain production problems. He had listed the various points in a talk a few years ago before the machinery group. In addition to discussing these problems, Mr. Murray outlined what he considers some of the current trends in feed manufacturing. The accompanying article is from Mr. Murray's talk at the 1955 mid-year meeting of the machinery association.

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"During December when rats drive indoors for food, by placing LARVACIDE Wick Bottles at strategic points in warehouse of 4,000 square feet, the building was kept practically free of rodent entry . . . at a cost of approximately $12."

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Insert soft string letting part hang outside as wick. Will release just enough fumes to keep rodents away, without bothering humans. Use one bottle for each 500-800 sq. ft.

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in faster production scales with closer tolerances. With more 50-lb. bags, it means 40 drops for a ton. If the scale is off just one extra ounce, that is almost 10¢ per ton.

Automatic feeders that will accurately weigh all the granulations and textures in a modern formula: The older weighing feeders (not volumetric) have been improved; also the method of push button selectivity of various ingredients in different bins. A great deal has been done on automatic weighing systems for feed mills and allied industries.

Better mixing equipment for micro-ingredients: This still remains a problem with us, although in our zest for improved feed quality and consistency we have been able to do a better job in our own mills in mixing. We have also set up closer, more exacting standards on the job to be done.

Production and maintenance records—This is in the feed man's bailiwick and is his complete responsibility since poor maintenance will show up in lost production time. However, some of the people in the feed industry need some help and recommendations on this from the manufacturer.

Machinery for mixing liquids and semi-viscous liquids on a dry base without the usual balling action: There is more accurate equipment for mixing liquids on the feed now than there was three years ago, but we still will form balls if we put liquids, and especially sticky ones, on dusty and small granulation ingredients. However, these balls should be broken up and thoroughly mixed on the dry base with additional mixing or grinding equipment.

These are some of the problems that have been with the feed mills for some time and some of the work that has been done on these hindrances to good operation and production.

We are now in a period where the production man will sketch out the flow that will produce a certain line of feeds successfully at the lowest cost consistent with the capital outlay of cash. And from these, engineers will draw up and design the mills and machinery.

Heretofore the engineers have laid out the mills as they thought that management wanted them and then have built them without too much thought or actual awareness of the production problems involved. Since the millwrights who built them and installed the machinery were the only persons who knew the flow of the mill, it was customary to keep them on as production superintendents of the mills. But by the very nature of their work, they were not trained as production personnel, and the result: Good production people in feed mills were at a minimum.

This is not now so, and the tendency is more and more away from this trend.

Previously, machinery manufacturers dealt mainly with engineers who usually decided what machinery to put in and who the maker would be. Now, with the trend for production personnel to lay out the flows, machinery people will be contacting more persons who work with the machines every day. Therefore, machinery company men must know their machines and capacities more accurately.

There are other trends in the feed business, too. One is to more pellets and bite-size feeds. And one is to more 50-lb. paper bags. Along with the 50-lb. trend in some areas is a growing trend to bulk feed deliveries. Bulk feed use is becoming quite concentrated in some areas.

There also is the trend toward the small mobile custom mixing and grinding equipment that will call at the farmer's barns and mix some feed for his livestock and poultry.

It appears as if there is somewhat of a trend away from the 75-100 ton per day complete feed mill to the small custom miller or concentrate mixer or else to the feed manufacturer who has capital to lay out for plant facilities for 200-400 tons per day and the working capital to go with this capacity.

(Editor's Note: The above comment has brought a considerable amount of disagreement from a number of industry men who feel that the medium-size feed manufacturer will continue to maintain his place in the industry and that the industry will not be limited only to the small custom millers and the larger feed manufacturers.)

In conclusion, as we look back over the progress that has been made in the last three years in our industry, we are amazed by the changes but equally eager to experience the changing trends that lie ahead.

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These are the most important women in your life. They are *your* customers. Keeping their loyalty centered on your brand is just about your most important job.

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V-90 means *dependable* baking results. V-90 means that your brands can be counted upon to produce the kind of oven products that make women happy . . . and loyal to your brand. This, of course, is the reason for the milling industry's remarkable allegiance to V-90.

There is still another reason for the popularity of V-90. Here it is. *No one has ever succeeded in duplicating V-90!* That's worth remembering. It means you can be SURE with V-90. That's worth remembering, too!

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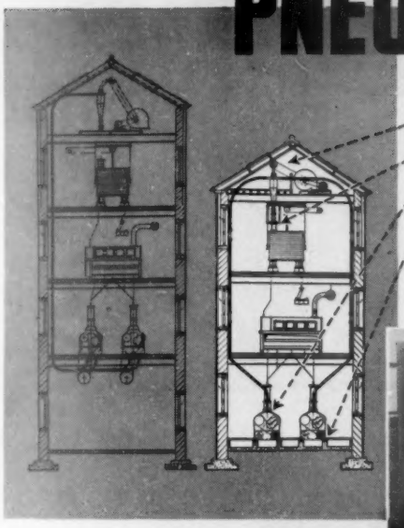

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CYCLONES mounted directly on to plansifter feed-boards.

MINIMUM LIFT — Stock is lifted vertically through rollermills.

A STRAIGHT FLOW from hopper allows basement-fitted rollermills.

A typical layout of Robinson Receiver Aspirators—Type PFm

Look for these five all-important factors when choosing a pneumatic conveying system 1—overall efficiency, 2—power consumption, 3—freedom from chokes, 4—simplicity of layout, 5—the space it occupies, plus freedom of access to vital machinery.

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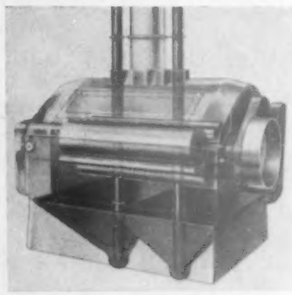
Compare the savings with the outmoded, conventional layout, left. See how bends are smoothed out—even avolded. Notice, too, how the vertical lift is cut down. 'Pneu-Flow' reduces building heights and power consumption.



A "ghosted" rollermill showing the vertical lift from the hoppers.

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Commercial Milling Tests Undertaken On Two New N.W. Wheat Selections

EDITOR'S NOTE: The Pacific Northwest Crop Improvement Assn. was requested to make arrangements for commercial scale mill tests on two new wheat selections. One, a hard red winter known as Rio-Rex/Nebred (later released as Columbia), was originally developed at the Sherman Branch Experiment Station, Moro, Ore. The other, a hard white winter known as 27-15/Rex-Rio 41, was developed at the Washington State College Experiment Station. Both had passed agronomic and smut resistance tests as a result of wide-spread cooperative investigations by the colleges of agriculture and the U.S. Department of Agriculture. Milling tests were carried out at the mill of Centennial Mills, Inc., at Wenatchee, Wash. The report on the tests was compiled by John Egli, plant superintendent, Preston - Shaffer Milling Co., Wattsburg, Wash. Mr. Egli is chairman of the research committee of the Association of Operative Millers, District No. 9.

v v

Rio-Rex/Nebred (Columbia)

Milling Test: One hundred eighty seven bushels, sufficient for about an hour and twenty minutes' run, were available. As received, the wheat registered 12.8% protein, 8.6% moisture and 60.6 lb. test weight. It was tempered at 14.4% moisture and put on the mill at 10 a.m. following a regular run of hard wheat blend. This provided a comparison as well as allowing time for the mill to warm up.

At first the bran clean up was poor, but was improved considerably by harder grinding on the break rolls. Closer grinding raised the possibility of an increase in ash. The Rex character or fuzzy middlings were apparent, but did not affect the clean up on the tail of the mill, at least for the length of time the wheat was on the mill. The middlings and flour felt very soft.

The consensus among millers was that the variety could be milled readily with a little adjustment on the rolls. Flour yield on the run was 71%. As far as milling quality was concerned the variety was recommended for release.

Baking Report: On the basis of six mill laboratories reporting, the following analysis was made by Otho P. Skaer, chairman of the Experiment Milling and Baking Test Committee of the American Association of Cereal Chemists, Pacific Northwest Section:

"All chemists report that this flour has satisfactory baking characteristics as compared with other local hard red winter wheats, and that they would favor the release of this variety.

"To review the milling and baking characteristics, it milled medium well, but not as free as some Montana winter wheats. The middlings reduce slow, but are fairly soft. The bran cleans (fairly) well. The sample lot was milled at 14.4% moisture at the first break roll. The yield was 71%

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flour. The flour analysis corrected was .40 ash, 11.4 protein (average). The farinograph showed a strong curve with a long mixing tolerance. The baking gave average loaf volume with very good texture and crumb color. The response to bromate was positive but not large. The absorption was a little low for this type of wheat.

"This wheat should prove a satisfactory hard red winter to use in bread flour mixes, if it will be confined to areas that will produce good protein levels."

27-15/Rex-Rio 41

Milling Test: A blended lot of 27-15/Rex-Rio 41 was placed on the mill immediately following the hard red winter lot. The blend totaling 306 bu. consisted of two approximately equal lots. It averaged 13.0% protein, 12.0% moisture, and 59.6 lb. test weight. The wheat was tempered at 14.3% moisture.

This selection showed more pronounced fuzziness in the middlings than did the Rio-Rex/Nebred (Columbia). The bran did not clean up well even after grinding harder on the breaks, and the tail of the mill loaded up somewhat. This lot was a poorer miller than a lot of the same selection at a lower protein level milled in 1954.

The flour yield was 71.2%. This compares with a 75% yield on the 1954 lot. The flour yield, however, was reasonable in comparison with comparable grinds on the mill.

It was agreed by those attending that another commercial milling test was not necessary on this selection, but that further laboratory experimental tests should be made in 1956.

There is general agreement among operative millers that when possible, at least a three-hour run on a commercial mill should be made to test future varieties.

Baking Report: The following report is a direct quotation from Mr. Skaer:

"All chemists reporting on this flour noted a change in the baking characteristics from the previous year's tests. The loaf volume was smaller than we would expect from a bread flour at this protein level. The texture was open, harsh and of a coarse character, which affected the crumb color though it was graded satisfactory, by most laboratories. The average flour analysis was .45 ash and 11.7 protein. The farinograph showed a very long mixing tolerance and strong hard wheat characteristics.

"The fuzzy middlings and only fair yield coupled with the high ash and poor baking results were factors which had not been expected of this selection. This may be due to growing conditions peculiar to this year and all agree that we should have another look at it next year.

Summary

On the basis of all testing work to date, it seems that both varieties yield comparable to Washington grown hard winter wheats, but not as good as Montana winter wheats. The "Rex character" or "fuzzy middlings" was apparent in both, and although it did not affect the bran clean-up with Rio-Rex/Nebred (Columbia), it did result in poorer clean-up on the 1955 production of 27-15/Rex-Rio 41. The latter finding was adverse to the 1954 results.

Baking qualitywise, the mixing tolerance was long on both varieties, and other characteristics were graded satisfactory although volume loaf, texture and crumb color on the 27-15/Rex-Rio 41 were poorer than would ordinarily be expected from a bread flour at this protein level.

Food Radiation Volumes Ready

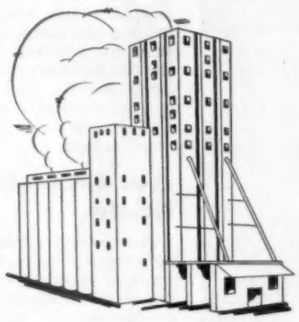
CHICAGO—A four-volume survey of available scientific literature on use of atomic radiation to sterilize foods has been prepared by the Quartermaster Food and Container Institute for the Armed Forces. The complete set may be obtained from the Office of Technical Services, U.S. Department of Commerce, Washington, for $24.

The first volume is a review of research in the fields of proteins, carbohydrates, meats, vitamins and enzymes.

A detailed bibliography of all available material in the field makes up the second and third volumes, costing $6.75 and $8, respectively. The volumes contain 4,537 references.

The fourth volume, priced at $7.25, is a subject index for the bibliography.

The Food and Container Institute prepared the survey to aid scientists in developing better food and packaging techniques for the Armed Forces. So rapidly has the literature on the effects of ionizing radiation increased that it has become almost an impossibility for any one investigator to keep abreast of new discoveries, developments and future possibilities and applications within this important field, the institute said.



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General Nathan Bedford Forrest
Confederate Cavalry Leader

It's good tactics in war.
It's good advice in grain fumigation.

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No. 5295—Boxcar Loader

The R. T. Sheehan Co. announces a new stacking unit that is combined with its "Flex-Bend conveyor," to provide a loader and stacker with flexibility. The stacker unit (shown at right) has an adjustable boom that is mechanically raised and lowered by push-button controls, conveniently located to the operator. The operator has only to guide the items into place

and swing the boom to right and left as stacking proceeds. The conveyor consists of a drive car, center cars and a power traveler car. The drive car powers the flexible belt. The center cars determine the length of the unit, as they may be added or removed to adjust the overall length. The power traveler car is to move the conveyor back and forth (shown at the left). The flexible belt conveyor bends on a 72° radius, either direction. Rate of belt travel is adjustable to application. Secure more complete details by checking No. 5295 on the coupon and mailing it.

No. 5232—Process Control

An electronic "watchdog," which is claimed to make it possible to test and control continuously an unlimited number of industrial processes from a single vantage point, has been developed by Fielden Instrument Division of Robertshaw-Fulton Controls Co. The new instrument, called an indicating scanner, monitors a variety of process variables involving level, temperature, thickness, mechanical movements, tolerances, weight and pressure. It will keep a steady check on six, 12, 24, 48 and more steps in a manufacturing process, the company says. Additional information may be obtained by checking No. 5232 on the coupon and mailing it to this publication.

No. 5263—Lift Truck System

A lift truck system, consisting of a patented lift jack and engaging bracket, in conjunction with semi-live platforms, is offered by the Hamilton Caster & Mfg. Co. According to the company, the "Hamilton heavy duty platforms, or skid trucks, are unique in their design and construction, and the special features of the jack and bracket facilitate quick starting and ease of operation. One or more lift jacks can be used in combination with any number of skid trucks." The system is said to be especially useful in applications where the use of palletizing and power trucks is not practical nor possible. When not in use, the lift jacks may be stored in an upright position and the skid trucks can be stacked. Check No. 5263 on the coupon and mail it to secure more details.

No. 5306—Bagging Scale

A two-color product data sheet describing its improved FFFP bagging scale is now offered by Richardson Scale Co. Equipped for either manual or automatic operation, the new scale will handle grain, crumbles, pellets, range cubes, granulated feed and many other mill products in weighings of 100, 50 and 25 lb. The data sheet describes new features of the FFFP, such as a pneumatic gate assist and a belt feeder. Operation of the scale is discussed, as well as standard and optional discharge features. Capacity, discharge rate, accuracy and scale components are listed. Also included on the data sheet are a photograph of the new model FFFP and a dimensioned engineering drawing. For copies of product data sheet No. 5001, check No. 5306 on the coupon and mail it to this publication.

No. 5250—Bag Closing Tape

A new aid to those who store or handle products normally contained in multiwall bags has been announced by the Chase Bag Co. The inventory aid is a smooth-finish tape in a wide variety of colors, which is sewn across the bottoms of multiwall bags as a "closing" tape. In the case of sewn valve multiwall bags, closing tapes are used on both tops and bottoms of bags. The new colored tape, called "Flattertape," is said to serve as a ready identification of the bag contents when bags are stacked and the printed surface of the bag is not visible. Other advantages claimed are the improved printing surface and the availability of colored inks to contrast with the tape. Natural kraft tape is also available in the same texture. The new tapes will be available for all customers who prefer them to the usual crepe-type tapes. It was announced that the tapes will lower cost to the user. For more complete details check No. 5250 on the coupon and mail it to this publication.

No. 3811—Flour Transfer Unit

The Fuller Co., a subsidiary of General American Transportation Corp., has introduced a new portable transfer unit for pneumatically transferring flour or other bulk ladings from General American Airslide railroad cars to Airslide bulk vans or to storage bins and silos. The new transfer unit is a combination of the Airslide air-activated gravity conveyor

and Airveyor pressure type conveying system. In this combination the flour is "fluidized" for charging into the conveying system by the blow-through type feeder. The unit is well balanced, and is mounted on running gear equipped with pneumatic-tired wheels with roller bearings, company officials said. It can be maneuvered by one man. It can be raised or lowered hydraulically to match the elevation of the outlets of the Airslide car, and contact is automatically maintained as the car rises on its springs during unloading. The transfer unit is 10 ft. long from handle to handle, has a maximum width of 40 in. and weighs 700 lb. Secure more complete details by checking No. 3811 on the coupon and mailing it.

No. 5302—Van System

Fruehauf Trailer Co. has been given exclusive manufacturing and distribution rights for the Clark Mobilvan System, a method for transporting large container shipments of merchandise, it was announced by Fruehauf and Clark Equipment Co. The system was developed by Clark and introduced early this year. It is based on the use of Clark fork lift trucks designed to automatically lock a van or container securely to the bed of a railroad flatcar or the chassis or flatbed of a trailer or truck. The container can also be used for overwater shipments. At its destination the container can become a storage structure for contents that are not immediately needed. Secure more complete details by checking No. 5302 on the coupon and mailing it to this publication.

No. 5294—Dust Collectors

Dust collectors of both the cabinet and cyclone type are now available with casters as optional equipment, according to an announcement by Torit Manufacturing Co., builders of individual collectors for dust, particles and fumes. The casters are made of hard rubber, 3 in. in diameter and 1 in. wide for smooth rolling. Two of the casters in each set are provided with locks, and all are welded to the bottom of each unit at the factory. Seventeen Torit dust collectors and their adaptations are affected by the development of this accessory. For additional information check No. 5294 on the coupon and mail it.

No. 5303—Grain Scales

The operation and uses of several automatic mill grain scales are described in a new data sheet offered by Richardson Scale Co. This type scale is used to weigh grain from storage to the grinding mill or process, and has a reported accuracy of 1/10 of 1%. The data sheet describes the operation cycle of the scale, as well as listing such design advantages as the even-arm beam, automatic locking gear, knife edge bearings and brush sealed radial gate. Copies of the data sheet 5502 may be obtained by marking No. 5303 on the coupon and mailing it to this publication.

Send me information on the items marked:

- ☐ No. 3811—Flour Transfer Unit
- ☐ No. 5232—Process Control
- ☐ No. 5250—Bag Closing Tape
- ☐ No. 5263—Lift Truck System
- ☐ No. 5294—Dust Collectors
- ☐ No. 5295—Boxcar Loader
- ☐ No. 5302—Van System
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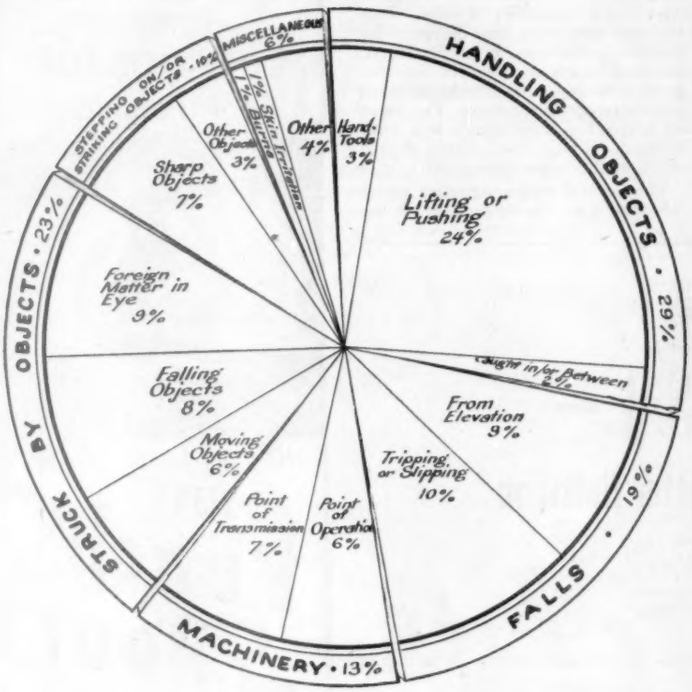
Analysis of Accidents in the Grain Milling Industry



Falls Are Serious Industry Safety Problem

EDITOR'S NOTE: The accompanying article on falls of persons in grain elevators is an excerpt from a bulletin issued by the safety engineering department, Kemper Insurance, Chicago.

From an analysis of accidents in the grain milling industry as shown on the accompanying pie chart, it can be seen that falls in grain elevators are a serious problem. They account for 19% of all accidents to employees, with tripping and slipping accounting for 10% and elevation falls accounting for 9%.

In all industry, falls injure about 450,000 workers on the job each year. Of this total number of injuries 2,500 result in death or total permanent disability, and about 10,000 result in some permanent partial disability. The National Safety Council, in an analysis of work injuries finds that of all fatal and total permanent injuries, 19% are traceable to falls of persons. This nation-wide average of 19% is the same as that for falls of persons in the grain milling industry.

Since 10% of the falls in the grain milling industry come from slipping and tripping hazards, it would naturally follow that a good housekeeping program would eliminate many of these accidents.

Have you ever stepped on an ear of corn and then suddenly wished you hadn't? After finding yourself sprawled on your back, you undoubtedly began to realize that a cluttered floor can be a dangerous hazard. Even grains of corn or wheat can cause a nasty accident. The solution is: After any load is dumped, take a few minutes with a broom and sweep up the floor around the bin. This should prevent many falls.

Clear aisles and clean floors in the storage and warehouse area will prevent many tripping and slipping accidents.

Falls from elevations are a serious problem, one that is harder to cope with than falls at the ground level, or at floor level. It is important that each elevator owner or manager check to see if there are any hazards present that can contribute to elevation falls.

Ladders to platforms, bins and machinery should be properly constructed and maintained to prevent falls. When a ladder leads to a platform, the side rails should be carried up 3½ ft. above the platform. Handrails should consist of top and intermediate rails, with top rail preferably of 2"x4" material located 3' 6" above the platform. The platform should be at least two boards wide.

—BREAD IS THE STAFF OF LIFE—

Centennial Installing New Modern Feed Mill at Portland

SEATTLE—Centennial Mills, Inc., reported recently that work is in progress at its Crown Mills in Portland, where a modern push-button feed mill is being installed.

"This work represents the final steps in completing a unit which will operate competitively with any feed mill on the Pacific Coast," Centennial officials said in the company's annual report for the year ended June 30.

"Expenditures of an additional $300,000 will allow completion of this completely modern facility by early 1956. Further, it will allow the consolidation of the manufacture of Centennial Feeds, still being carried on in a separate plant, and Crown Feeds.

"The Centennial property in East Portland is to be sold once the new Crown feed mill is in operation."

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BOLTING CLOTH

(Continued from page 1a)

have measured the openings of their fabrics and have published the results in tables available through the distributors of the cloth. Unfortunately, different methods of measurement and evaluation have been used. It is not the purpose of this article to pass judgment on these different methods and to select the "best" one. Each has its good and bad points. However, the attention of the users has to be drawn to the unfortunate fact that the measurements given by the different manufacturers were not arrived at by the same method and that the results are not comparable except in a very general way.

Let us see how this confusion came about. The shape of the mesh opening in a perfect bolting cloth of full-gauze construction would be hexagonal. Which dimension of the hexagon should be taken as the mesh opening: the distance between two parallel sides, the distance between two opposite corners, or a combination of the two? In practice, the three choices represent the following methods of measurements: the mesh opening measured between woof threads represents the distance between parallel sides of the hexagon; the mesh opening measured between warp threads represents the distance between opposite corners. The same as above, the third choice is a combination of the two. Each of the three methods has been used.

The second major complication is introduced by the evaluation of the

Advertisement

INSIDE SCIENCE

White Flour in the U.S.A.—

Enriched* with Vitamins and Iron for Better Nutrition

by Science Writer

This article is one of a series devoted to the enrichment of family white flour, white bread and rolls, corn meal and grits, macaroni products and white rice.

The enrichment of family white flour with thiamine, riboflavin, niacin and iron by American millers is a major success. It has made great contributions to better health in the United States by improving a staple food.

Since the start of the program in 1941 by millers, voluntarily, the evidence is conclusive that enrichment not only has reduced the number of cases of certain dietary diseases but also is promoting the mental and physical vigor and well-being of the U. S. population generally. Because of its demonstrated value, the principle and practice of enrichment have been applied to other foods made from grains: corn meal and grits, white rice, macaroni, spaghetti, noodles, pastina, farina—and, of course, to white bread and rolls.

Doctors and diet experts have long supported white flour enrichment. The Council on Foods and Nutrition of the American Medical Association and the Food and Nutrition Board of the National Research Council are on record as endorsing the practice.

The legislatures of a majority of the States plus Hawaii and Puerto Rico have enacted laws which make mandatory the enrichment of all family white flour, as well as white bread, sold commercially in those areas.

American homemakers, too, favor foods they know to be enriched—a fact demonstrated by surveys. They look for these words on package labels: "Enriched with vitamins and iron for better nutrition."

What Is Enrichment?

It's an axiom in the milling industry that consumers want beautifully fine, white flour. When wheat is milled and processed to get the white flour which the public demands, vitamin and mineral values are unavoidably lost.

Enrichment restores to white flour the following important vitamin and mineral factors: thiamine, riboflavin, niacin and iron. Calcium also may be added as an optional ingredient. The process is simple and inexpensive. A mixture of the vitamins and iron is fed into the flour stream during processing. This insures that the enriching ingredients are spread evenly throughout the flour.

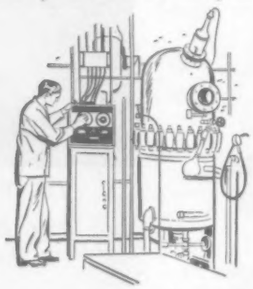
The U. S. Food and Drug Administration has established standards which white flour must meet to be properly labeled enriched. The requirements, in milligrams per pound, are:

	Min.	*Max.*
Thiamine (vitamin B_1)	2.0	2.5
Riboflavin (vitamin B_2)	1.2	1.5
Niacin (another "B" vitamin)	16.0	20.0
Iron	13.0	16.5

(In Canada, too, the same standards have been set for enriched white flour through the amendment of the Food and Drugs Act.)

Vitamins Are Made

The science of chemistry is so advanced these days that many of Nature's complex substances can be "duplicated" in the laboratory. This has happened with many vitamins. First, the chemical composition is learned. Second, the pure substance is isolated. Third, a "duplicate" is made by synthesis. And fourth, the laboratory techniques are extended to large scale operation.



The manufactured "duplicate" is identical chemically and in biological activity with Nature's own product. A vitamin is still a vitamin regardless of its source. So efficient is large scale manufacturing that vitamins are sold at a lower cost than if they were extracted from natural sources.

The Hoffmann-La Roche people make top quality vitamins actually by the tons. To do this they use amazingly complex processes with scientific production controls and the latest equipment which fill buildings each a city block square and many stories high.

Reprints of this article, and all others in this series are available without charge. Please send your request to the Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul Street, West; Montreal, Quebec.

The watermills are gone. Today's needs require today's methods. How sensible it is that millers across the nation restore health-giving vitamins and minerals through enrichment.

*Webster's Merriam Collegiate Dictionary includes this definition of "enrich": "to improve (a food) in nutritive value by addition in processing of vitamins and minerals".

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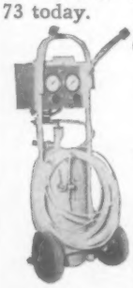

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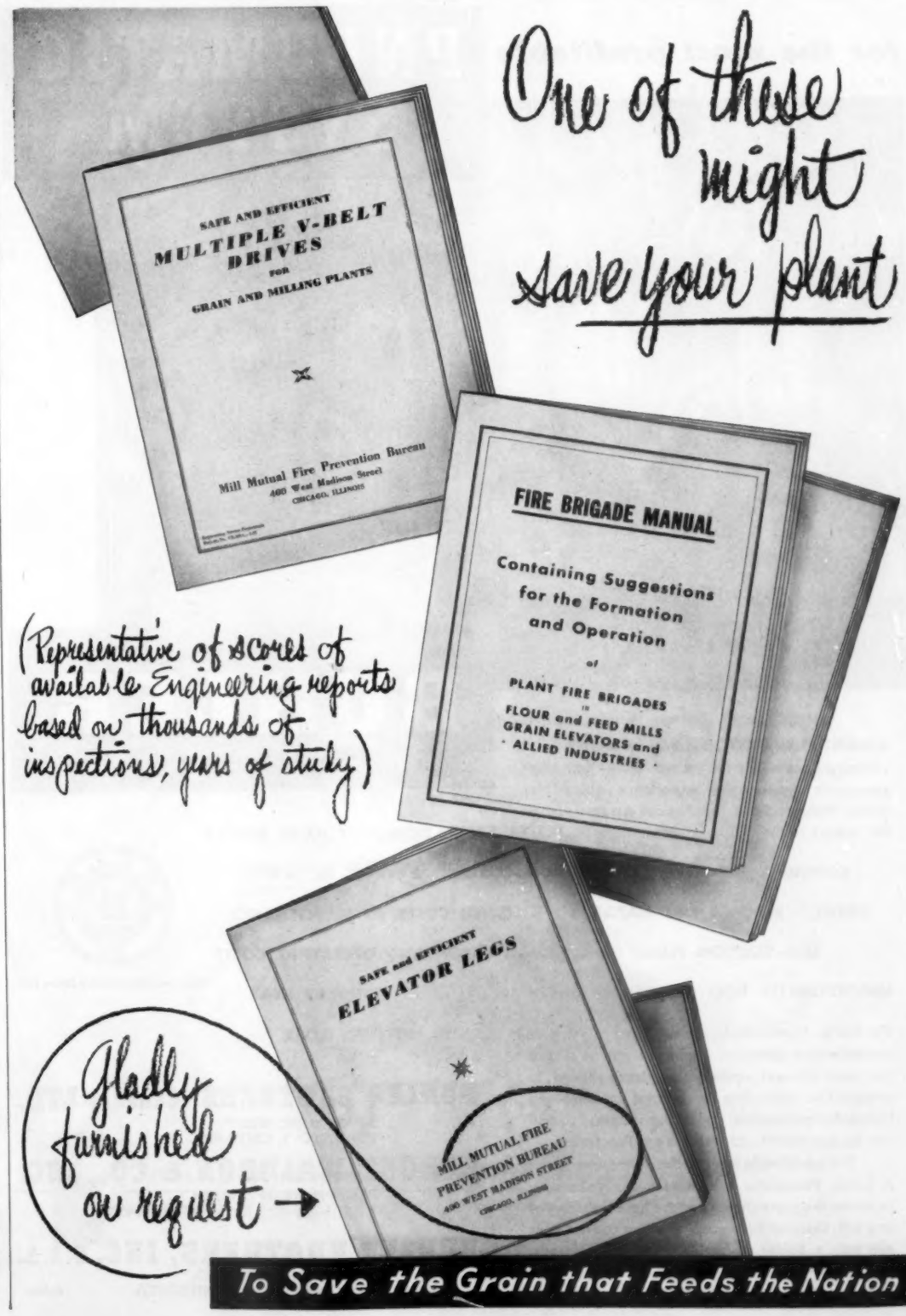
results. Are we to use the arithmetic mean (average) of the measured openings as the correct mesh opening, or should we use the mode (i.e., the most frequently occurring size)? Both methods have been used; both can be justified.

Approximate Guide

The lack of any uniform method in the measurements of mesh openings of silk bolting cloth has led to the following result. The tables of mesh openings published by the various manufacturers are very helpful for the comparison of different numbers of cloth of one brand. They can serve as an approximate guide only, when brands of different manufacturers are compared with each other, or when the silk bolting cloth is to be compared with wire cloth or nylon fabrics.

It would be a relatively simple matter for each manufacturer to mark his fabrics with the mesh opening in microns together with the conventional number. If these mesh openings are used for purposes of comparison with wire cloth or with nylon monofilament fabrics, where they will serve as a guide for the initial choice of the substitute fabric, the presently available figures will be adequate. The final choice will have to be made by experimentation.

On the other hand, if the mesh openings indicated on silk bolting cloth are to be used for the exact comparison between various brands of such cloth, a remeasurement on all brands according to a standard method would become necessary. This would be a very tedious, expensive and time-consuming job. The work involved in such an undertaking would not be justified by the benefits derived from it.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Pfizer Joins in Plan to Build Atomic Reactor

NEW YORK—Chas. Pfizer & Co., Inc., has joined seven other corporations in a plan to build an atomic reactor for research use, Dr. John E. McKeen, president of the Brooklyn drug and chemical firm, announced recently.

To be called the Industrial Reactor Laboratories, the facility will be located on a 250-acre tract within 50 miles of New York City. Options have already been taken on two sites in New York and New Jersey.

The reactor will be constructed by AMF Atomics, Inc., a subsidiary of the American Machine & Foundry Co. It will be the first in the world to be owned and operated by private companies for research in the use of nuclear energy in industry and medicine. Cost is estimated between $1,500,000 and $2,000,000.

Participating in the formulation of the plans, besides Pfizer and AMF Atomics, Inc., are the American Tobacco Co., Continental Can Co., Corning Glass Works, International Nickel Co., Socony Mobil Oil Co. and U.S. Rubber Co.

Construction is scheduled to begin in early fall. The facility is expected to be ready for use a year later. Final selection of the site is subject to clearance by the Atomic Energy Commission, from which the reactor's fissionable fuel will be obtained on a lease basis.

Pfizer, Dr. McKeen noted, began radiological research several years ago at the Pfizer Therapeutic Institute, Maywood, N.J. Participation in the industrial reactor group, he said, will enable Pfizer to broaden its atomic radiation program and to direct its efforts not only at pharmaceutical and medical research but into the fields of agriculture, nutrition and fermentation chemistry as well.

As part of its output, Dr. McKeen said, the reactor will furnish short-lived radioactive isotopes for use in tracing the action of drugs in the body. These rare isotopes have a life-span of only a few days, he explained, and normally are not readily available for medical research.

The reactor, Dr. McKeen reported, will also make possible the study of radiation as a method of sterilizing drugs and preserving foods.

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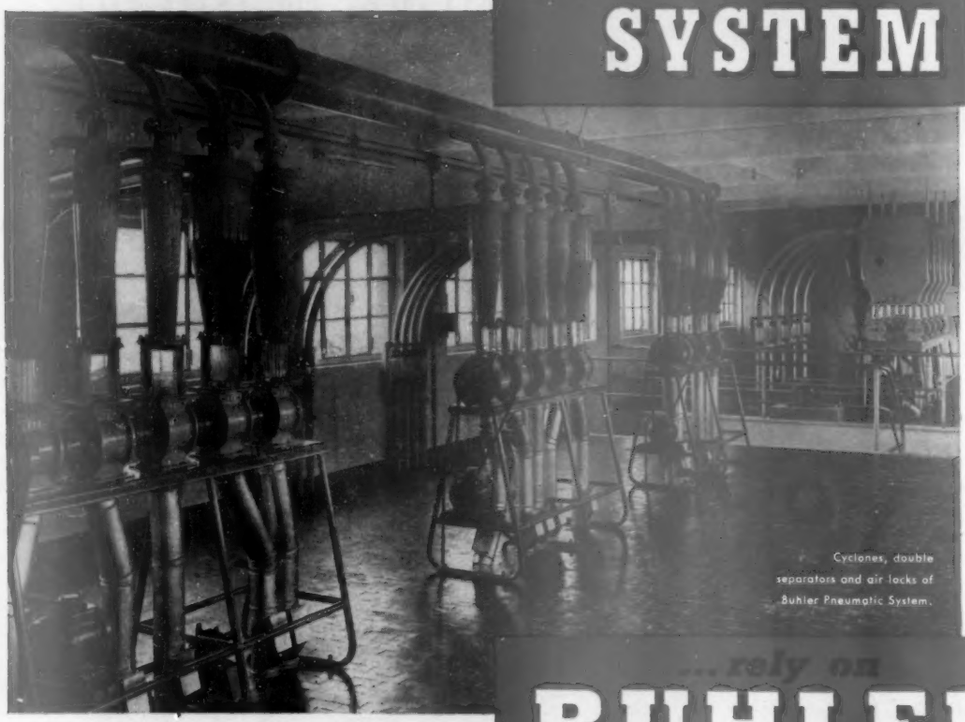

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—BREAD IS THE STAFF OF LIFE—

Macaroni Companies To Merge Operations

ST. LOUIS—Viviano & Brothers Manufacturing Co. of St. Louis, has announced that it will merge with the Prince Macaroni Co., Lowell, Mass. The announcement was made by Peter Ross Viviano, president of the St. Louis firm.

The merger will combine the two firms into the largest macaroni manufacturing company in the U.S., Mr. Viviano said. Mr. Viviano will be an officer and director, as will Joseph Pellegrino, president of the Prince company. Six plants of the combined company will be operated. They are located in St. Louis, Lowell, New York City, Cleveland, Chicago and Rochester, N.Y. Mr. Viviano was elected a director of the Prince company three months ago. Negotiations for the merger got underway a year ago. At that time the St. Louis plant began an extensive remodeling program which now has been completed.

—BREAD IS THE STAFF OF LIFE—

Continental Buys 9th Vessel for Storage

BUFFALO—Continental Grain Co. has added the ninth vessel to its grain storage fleet here with the purchase of the freighter Penobscot from the Nicholson Transit Co.

The boat, which has been idle in Detroit, will be towed to Buffalo and placed at the Concrete Elevator to take on 275,000 bu. of grain. This will bring Continental's storage capacity of its grain fleet to in excess of 2,000,000 bu.

With grain flowing down the lakes again after the six-week strike here, the storage problem in most commercial elevators is considered acute. Some elevators are filled and management is seeking to rent space.

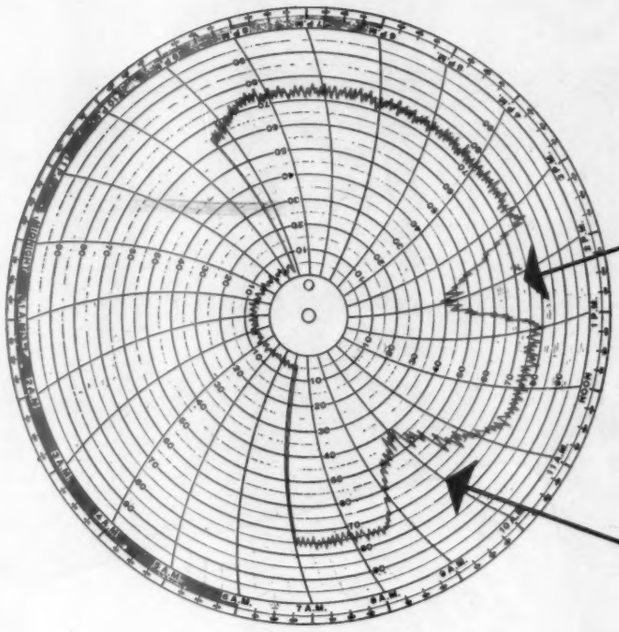
—BREAD IS THE STAFF OF LIFE—

Central Soya Builds Temporary Storage

GIBSON CITY, ILL.—The local plant of Central Soya Co. and McMillen Feed Mills has added temporary storage facilities to provide space for the record 1955 soybean crop now being harvested.

Connecting walls 40 ft. high were erected between and across existing rows of silos to provide the additional space. A floor was paved in the enclosed area and a temporary covering will be installed.

The company expects to maintain these temporary facilities until the peak load has been reached and supplies have returned to normal.



these mean trouble...

IT MIGHT BE a broken belt, a torn sieve, or a choke-up somewhere in the spouting.

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W&T Massometers and Merchen Scale Meters provide a continuous record — *by weight* — of actual mill performance. They tell you the *exact* flow rate of your streams and they pinpoint time and production losses.

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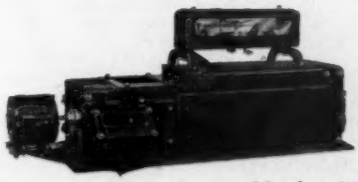
For complete information, write us today or communicate with your nearest W&T representative.

Massometer



Merchen Scale Meter

WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

THE PERFECT PAIR... for the first two steps at head of cleaning

The Carter Scalperator is used to rough scalp and aspirate grain as it is unloaded for storage, and to aerate and turn stored grain. Designed to handle all types of grain, the Scalperator is made in several sizes, with maximum capacities ranging from 1,000 to 6,000 bushels per hour.

The Carter Millerator is used extensively for refined screening and aspirating at head of mill cleaning streams. It also is being used increasingly as a final cleaning operation to remove insect and rodent contamination from wheat, corn and other grains. Other applications include cleaning soybeans and removing hulls from cracked beans.

HART-CARTER COMPANY

673 Nineteenth Avenue N.E. • Minneapolis 18, Minnesota

ENGINEERS AND MANUFACTURERS OF GRAIN CLEANING MACHINERY